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EXAMINER	
CORBETT, JOHN M	
ART UNIT	PAPER NUMBER
2882	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,572	KOHLER ET AL.	
	Examiner	Art Unit	
	JOHN M. CORBETT	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Rasche et al. (WO02/103639 A2).

With respect to claim 9, Rasche et al. discloses an image processing device (1), comprising:

a memory (3) for storing volumetric data (D), the volumetric data include a plurality of projections (Page 5, lines 9-11, D_{ij}) corresponding to a plurality of time points (Page 5, line 12, t); and

an image processor (4) for reconstructing an image of an object (Page 1, line 2, patient) from the volumetric data of the object, the image processor is adapted to perform the following operation:

estimating a motion of the object (Page 5, lines 14-20, ECG used to estimate motion by determining phase);

determining a plurality of motion fields from volumetric image data and the estimated motion of the object (Page 5, lines 28-34 and Figure 1, motion information B);

determining first time points (phase of motion) based on the plurality of motion fields (Figure 1), where the motion of the object is minimal (Page 6, lines 7-19 and Figure 1); and

selecting projections from the plurality of projections on the basis of the first time points (Page 5, lines 16-27 and Figure 1); and

reconstructing the image from the projections selected from the plurality of projections (G).

With respect to claim 10, Rasche et al. further discloses the image processing device is a CT system suitable for cardiac CT (Page 1, lines 1-18 and Page 5, lines 8-20);

the volumetric data correspond to cardiac CT data (D) and one of simultaneously measured electrocardiogram data (E) and photoplethysmographic data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. as applied to claim 9 above, and further in view of Weruaga et al. ("Estimating

Volumetric Motion in Human Thorax with Parametric Matching Constraints", June 2003, IEEE Transactions on Medical Imaging, Volume 22, Number 6, Pages 766-772).

With respect to claim 1, Rasche et al. discloses a method comprising:

acquiring (Page 5, lines 8-12) volumetric image data (data set D) indicative of a moving organ (Page 5, lines 31-32, heart or coronary vessels) during at least a sub-portion of a movement cycle of the moving organ (Figure 1);

acquiring a signal indicative of the movement cycle (E);

determine motion fields that describe motion of the moving organ during the movement cycle based on the image data and the signal (Page 5, lines 28-34 and Figure 1, motion information B);

determining where the motion is minimal based on the motion fields (Page 1, lines 6-27, Page 5, line 28- Page 6, line 7 and Figure 1);

selecting a portion of the image data that corresponds to where the motion is determined to be minimal (Page 6, lines 7-19 and Figure 1); and

reconstructing an image from the selected portion of the image data (G).

Rasche et al. fails to explicitly disclose using a similarity measure to determine motion fields, the similarity measure is a difference measure.

Weruaga et al. teaches using a similarity measure to determine motion fields, the similarity measure is a difference measure (Page 767, Section B. Volumetric Motion Estimation, Pages 767-768, Section A. Similarity Operator and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Rasche et al. to include the measure of Weruaga et al., since a person would have been motivated to make such a modification to improve imaging by improving accuracy and precision of a common method used to describe motion (Page 767, Col. 1, lines 43-45 and 60-62 and Page 771, Col. 1, lines 47-50) as taught by Weruaga et al.

Furthermore, since the Examiner finds that the prior art reference (i.e., Weruaga et al.) contained a method upon which the claimed invention can be seen as an improvement (i.e., motion field determination utilizing similarity measure), and since the Examiner finds that the prior art contained a method that has been improved in the same way as the claimed invention (i.e., difference measures between two volumetric Computed Tomography data sets acquired at different phases of motion), the Examiner thus finds that one of ordinary skill in the art could have applied the known improved technique in the same way to the base method and the results would have been predictable.

With respect to claim 2, Rasche et al. further discloses the volumetric image data corresponds to cardiac CT data and one of simultaneously measured electrocardiogram data and photoplethysmographic data (Page 5, lines 8-34).

With respect to claim 3, Rasche et al. further discloses the plurality of motion fields are indicative of motion between motion phases of the movement cycle (Page 2, lines 7-8, Page 5, lines 21-30 and Figure 1).

With respect to claim 4, Rasche et al. further discloses the volumetric image data correspond to the coronary artery region and simultaneously measured electrocardiogram data (Page 5, lines 14-20 and lines 31-32).

With respect to claim 19, Rasche et al. discloses the device as recited above.

Rasche et al. fails to explicitly disclose a magnitude of the motion based on a difference measure.

Weruaga et al. teaches a magnitude of the motion based on a difference measure (Page 767, Section B. Volumetric Motion Estimation, Pages 767-768, Section A. Similarity Operator and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rasche et al. to include the measure of Weruaga et al., since a person would have been motivated to make such a modification to improve imaging by improving accuracy and precision of a common method used to describe motion (Page 767, Col. 1, lines 43-45 and 60-62 and Page 771, Col. 1, lines 47-50) as taught by Weruaga et al.

Furthermore, since the Examiner finds that the prior art reference (i.e., Weruaga et al.) contained a device adapted to perform a method upon which the claimed invention can be seen as an improvement (i.e., motion field determination utilizing similarity measure), and since the Examiner finds that the prior art contained a method that has been improved in the same way as the claimed invention (i.e., difference measures between two volumetric Computed Tomography data sets acquired at different phases of motion), the Examiner thus finds that one of ordinary

skill in the art could have applied the known improved technique in the same way to the base method and the results would have been predictable.

With respect to claim 20, Rasche et al. discloses the device as recited above.

Rasche et al. fails to disclose a magnitude of the motion based on a similarity measure.

Weruaga et al. teaches a magnitude of the motion based on a similarity measure (Page 767, Section B. Volumetric Motion Estimation, Pages 767-768, Section A. Similarity Operator and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rasche et al. to include the measure of Weruaga et al., since a person would have been motivated to make such a modification to improve imaging by improving accuracy and precision of a common method used to describe motion (Page 767, Col. 1, lines 43-45 and 60-62 and Page 771, Col. 1, lines 47-50) as taught by Weruaga et al.

Furthermore, since the Examiner finds that the prior art reference (i.e., Weruaga et al.) contained a device adapted to perform a method upon which the claimed invention can be seen as an improvement (i.e., motion field determination utilizing similarity measure), and since the Examiner finds that the prior art contained a method that has been improved in the same way as the claimed invention (i.e., difference measures between two volumetric Computed Tomography data sets acquired at different phases of motion), the Examiner thus finds that one of ordinary skill in the art could have applied the known improved technique in the same way to the base method and the results would have been predictable.

3. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Weruaga et al. as applied to claim 4 above, and further in view of Vaillant et al. (US 6,385,285 B1) and Chen et al. ("Kinematic and Deformation Analysis of 4-D Coronary Arterial Trees Reconstructed From Cine Angiograms", June 2003, IEEE, Volume 22, Number 6, Pages 710-721).

With respect to claim 5, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. fails to explicitly disclose setting of a gating window;

on a variation of the gating window, a new image is reconstructed in real-time; and

the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches setting of a gating window (Col. 2, lines 44-48); and

the new image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the selecting and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise instant of the cardiac cycle to successfully complete the procedure (Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, lines 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve successful outcomes and enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

With respect to claim 6, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. fails to disclose the variation of the gating window is based on the first time points such that the gating window is automatically set to time points where there is minimal motion in the object such that the new image is automatically optimized.

Chen et al. further teaches the variation of the gating window is based on the first time points such that the gating window is automatically set to time points where there is minimal motion in the object such that the new image is automatically optimized (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient

outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Weruaga et al., Vaillant et al. and Chen et al. as applied to claim 5 above, and further in view of Flohr et al. (US 6,381,487 B1).

With respect to claim 7, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. further discloses an input from a user (Page 7, line 21) for optimization (Page 6, lines 5-7).

Rasche et al. fails to disclose interactive.

Flohr et al. teaches interactive (Figures 12-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the interacting of Flohr et al., since a person would have been motivated to make such a modification to improve imaging results by allowing the operator vary parameters until a satisfactory image in a desired phase is achieved (Col. 9, lines 24-32) as taught by Flohr et al.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Weruaga et al. as applied to claim 4 above, and further in view of Grangeat et al.

("Theoretical framework for a dynamic cone-beam reconstruction algorithm based on a dynamic particle model", 17 July 2002, Phys. Med. Biol., Volume 47, Pages 2611-2625).

With respect to claim 8, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. further teaches segmenting the coronary vessel tree from the volumetric data; and

the determination of the plurality of motion fields is performed such that the plurality of motion fields describes motions of areas of the coronary vessel tree (Page 3, lines 24-25).

Rasche et al. as modified above fails to disclose performing a sliding reconstruction of the volumetric data.

Grangeat et al. teaches performing a sliding reconstruction of the volumetric data (Pages 2615-2621, Section 4. The dynamic cone-beam reconstruction algorithm).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the sliding of Grangeat et al., since a person would have been motivated to make such a modification to improve imaging without increasing the dose to the patient (Abstract) Grangeat et al.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. as applied to claim 9 above, and further in view of Vaillant et al. and Chen et al.

With respect to claim 11, Rasche et al. as modified above suggests the device as recited above.

Rasche et al. further discloses the volumetric data correspond to a coronary artery region (Page 4, lines 23-25) and simultaneously measured electrocardiogram data (E).

Rasche et al. fails to explicitly disclose the image processing device is a multi-slice computed tomography (CT) system.

Rasche et al. fails to disclose the selection of the projections from the plurality of projections corresponds to a setting of a gating window;

on a variation of the gating window, a new image is reconstructed on the basis of an iterative reconstruction optimization in real-time;

and the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches the selection of the projections from the plurality of projections corresponds to a setting of a gating window (Col. 2, lines 44-48);

an image is reconstructed on the basis of an iterative reconstruction optimization in real-time (Col. 1, lines 65-66 and Col. 2, lines 16-18); and

the image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rasche et al. to include the selecting, iterative reconstructing and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve imaging by utilizing a proven method of reconstruction which provides

good image quality while from a limited number of input projection image and to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise instant of the cardiac cycle need to successfully complete the procedure (Col. 1, lines 54-60 and Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the device of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

7. Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh (US 6,529,575 B1).

With respect to claim 12, Rasche et al. discloses performing the following operation:

determining a plurality of motion fields from volumetric data corresponding to a scanned object (Page 5, lines 28-34 and Figure 1, motion information B);

determining first time points (phase of motion) where the motion of the object (patient) is minimal on the basis of the motion fields (Page 6, lines 7-19 and Figure 1); and

selecting projections from the plurality of projections on the basis of the first time points (Page 5, lines 16-27 and Figure 1); and

reconstructing the image from the projections selected from the plurality of projections (G).

Rasche et al. fails to explicitly disclose a computer readable medium encoded with computer executable instructions, which, when executed by a computer, cause the computer to perform operations.

Hsieh teaches a computer readable medium encoded with computer executable instructions, which, when executed by a computer, cause the computer to perform operations (Col. 8, line 57 - Col. 9, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the configuration of Rasche et al. to include a machine readable medium of Hsieh, since a person would have been motivated to make such a modification to more easily update existing systems to implement the invention (Col. 8, line 66 - Col. 9, line 1) as taught by Hsieh.

With respect to claim 15, Rasche et al. further discloses necessarily describes inter-image motion (Page 5, lines 28-34 and Figure 1, motion information B).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh as applied to claim 12 above, and further in view of Miyazaki et al. (US 2002/0032376 A1).

With respect to claim 13, Rasche et al. as modified above suggests the configuration as recited above.

Rasche et al. further discloses the volumetric data correspond to cardiac CT data (Page 5, lines 8-34 and Figure 1) and simultaneously measured data (E).

Rasche et al. fails to disclose photoplethysmographic.

Miyazaki et al. discloses photoplethysmographic (Paragraph 246, PPG).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the photoplethysmographic technique of Miyazaki et al., since electrocardiogram (ECG) and photoplethysmogram (PPG) measurements to measure heart beats are two art recognized equivalents (Paragraph 244) as shown by Miyazaki et al. and require no more than ordinary skill in the art to substitute. One of ordinary skill in the art would have been motivated to make such a modification to improve imaging by removing the heartbeat sensor out of the cardiac imaging field of view by placing locating the sensor at a remote position such as on a finger (Paragraph 246) as implied by Miyazaki et al.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh as applied to claim 12 above, and further in view of Vaillant et al. and Chen et al.

With respect to claim 14, Rasche et al. as modified above suggests the configuration as recited above.

Rasche et al. further discloses the volumetric data correspond to a coronary artery (Page 4, lines 23-25).

Rasche et al. fails to disclose the selection of the projections from the plurality of projections corresponds to a setting of a gating window;

on a variation of the gating window, a new image is reconstructed on the basis of an iterative reconstruction optimization in real-time; and

the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches the selection of the projections from the plurality of projections corresponds to a setting of a gating window (Col. 2, lines 44-48);

an image is reconstructed on the basis of an iterative reconstruction optimization in real-time (Col. 1, lines 65-66 and Col. 2, lines 16-18); and

the image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the configuration of Rasche et al. to include the selecting, iterative reconstructing and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve imaging by utilizing a proven method of reconstruction which provides good image quality while from a limited number of input projection image and to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise instant of the cardiac cycle need to successfully complete the procedure (Col. 1, lines 54-60 and Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

10. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh as applied to claim 12 above, and further in view of Weruaga et al.

With respect to claim 16, Rasche et al. as modified above suggests the configuration as recited above.

Rasche et al. fails to explicitly disclose a magnitude of the motion based on a difference measure.

Weruaga et al. teaches a magnitude of the motion based on a difference measure (Page 767, Section B. Volumetric Motion Estimation, Pages 767-768, Section A. Similarity Operator and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the measure of Weruaga et al., since a person would have been motivated to make such a modification to

improve imaging by improving accuracy and precision of a common method used to describe motion (Page 767, Col. 1, lines 43-45 and 60-62 and Page 771, Col. 1, lines 47-50) as taught by Weruaga et al.

Furthermore, since the Examiner finds that the prior art reference (i.e., Weruaga et al.) contained a device adapted to perform operations upon which the claimed invention can be seen as an improvement (i.e., motion field determination utilizing similarity measure), and since the Examiner finds that the prior art contained operations that has been improved in the same way as the claimed invention (i.e., difference measures between two volumetric Computed Tomography data sets acquired at different phases of motion), the Examiner thus finds that one of ordinary skill in the art could have applied the known improved technique in the same way to the base operations and the results would have been predictable.

With respect to claim 17, Rasche et al. as modified above suggests the configuration as recited above.

Rasche et al. fails to disclose a magnitude of the motion based on a similarity measure.

Weruaga et al. teaches a magnitude of the motion based on a similarity measure (Page 767, Section B. Volumetric Motion Estimation, Pages 767-768, Section A. Similarity Operator and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the measure of Weruaga et al., since a person would have been motivated to make such a modification to improve imaging by improving accuracy and precision of a common method used to describe

motion (Page 767, Col. 1, lines 43-45 and 60-62 and Page 771, Col. 1, lines 47-50) as taught by Weruaga et al.

Furthermore, since the Examiner finds that the prior art reference (i.e., Weruaga et al.) contained a device adapted to perform operations upon which the claimed invention can be seen as an improvement (i.e., motion field determination utilizing similarity measure), and since the Examiner finds that the prior art contained operations that has been improved in the same way as the claimed invention (i.e., difference measures between two volumetric Computed Tomography data sets acquired at different phases of motion), the Examiner thus finds that one of ordinary skill in the art could have applied the known improved technique in the same way to the base operations and the results would have been predictable.

With respect to claim 18, Rasche et al. as modified above suggests the configuration as recited above.

Rasche et al. fails to disclose comparing the motion fields to a threshold.

Weruaga et al. further teaches comparing the motion fields to a threshold (Page 768, Col. 1, lines 7-10, Page 769, Col. 1, second line from bottom and Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the threshold of Weruaga et al., since a person would have been motivated to make such a modification to improve imaging by discarding from consideration voxels with similarity values that indicated motion outside a desired limit (Page 768, Col. 1, lines 7-10) as implied by Weruaga et al.

Response to Arguments

11. Applicant's arguments with respect to at least claims 1, 9 and 12 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Buzug et al. ("Voxel-Based Similarity Measures for Medical Image Registration in Radiological Diagnosis and Image Guided Surgery", 1998, Journal of Computing and Information Technology, Volume 2, Pages 165-179) discloses determination of motion-vector fields and registration through the use of similarity measures (Abstract and Figure 1).

Gorce et al. ("Estimation of three-dimensional cardiac velocity fields: assessment of a differential method and application to three-dimensional CT data", 1996, Medical Image Analysis, Volume 1, Number 3, Pages 245-261) discloses recovering 3-D cardiac motion fields from sequential 3-D x-ray CT or MR images utilizing the optical flow technique (Abstract, Introduction and Figure 1, 3, 5 and 8-10).

Brown ("A Survey of Image Registration Techniques", 1992, ACM Computing Surveys, Volume 24, Number 4, Pages 325-376) discloses image registration methods to include absolute difference similarity methods (Page 344, Col. 2).

Manzke et al. ("Extended Cardiac Reconstruction (ECR): A helical cardiac cone reconstruction method", 30 June 2003, Proceedings of the VIIth International Conference on Fully 3D Reconstruction in Radiology and Nuclear Medicine, Presentation ID Number MO-PM2-4) discloses a cone beam cardiac reconstruction method which utilizes a weighting function to generated a gating window (Section III. Weighting).

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. CORBETT whose telephone number is (571)272-8284. The examiner can normally be reached on M-F 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. M. C./
Examiner, Art Unit 2882

/Chih-Cheng Glen Kao/
Primary Examiner, Art Unit 2882